AD-A222 382

USAWC MILITARY STUDIES PROGRAM PAPER

The views expressed in this paper are those of the author and do not necessarily reflect the views of the Department of Defense or any of its agencies. This doc ıent may not be released for open publication until it has been cleared by the appropriate military service or government agency.

JOINT TACTICAL COMMAND, CONTROL AND COMMUNICATIONS (C3) INTEROPERABILITY

An Individual Study Project
Intended for Publication

by

Lieutenant Colonel Herbert D. Dyer, SC

James W. Williams, Ph.D
Project Adviser

DISTRIBUTION STATEMENT A: Approved for public release; distribution is unlimited.

U.S. Army War College
Carlisle Barracks, Pennsylvania 17013
12 March 1990

DTIC
ELECTE
JUN 0 6 1990
S D
B

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE

READ INSTRUCTIONS BEFORE COMPLETING FORM

1. REPORT NUMBER

2. GOVT ACCESSION NO.

3. RECIPIENT'S CATALOG NUMBER

4. TITLE (and Subtitle)

Joint Tactical Command, Control and Communications (C3) Interoperability

5. TYPE OF REPORT & PERIOD COVERED

Study Project

6. PERFORMING ORG. REPORT NUMBER

7. AUTHOR(s)

Herbert D. Dyer, Lieutenant Colonel, SC

8. CONTRACT OR GRANT NUMBER(s)

9. PERFORMING ORGANIZATION NAME AND ADDRESS

U.S. Army War College
Carlisle Barracks, PA 17013-5050

10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS

11. CONTROLLING OFFICE NAME AND ADDRESS

Same

12. REPORT DATE

12 March 1990

13. NUMBER OF PAGES

37

14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)

15. SECURITY CLASS (of this report)

Unclassified

15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

Approved for public release; distribution is unlimited.

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

Any conflict the United States becomes involved in will be fought jointly by its armed forces. Our ability to adequately command and control forces in battle depends upon interoperable communications between the services. This study traces our efforts to develop joint tactical command, control and communications (C3) interoperability throughout the Department of Defense. By looking at the evolution of a joint management structure it shows why it has taken over 25 years to reach consensus among the services on

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

interoperability. More importantly, it shows how we will comand and control our forces if we have to fight today. This study was written for staff officers, not communicators. It provdes insight into joint command and control tools available in every service. The thesis of the study is that great progress has been achieved by the war-fighting CINCs in C3 interoperability. The challenge now is for staff officers to become proficient in the use of joint command and control tools.

ABSTRACT

AUTHOR: Herbert D. Dyer, LTC, SC

TITLE: Joint Tactical Command, Control and Communications (C3) Interoperability

FORMAT: Individual Study Project Intended for Publication

DATE: 12 March 1990

PAGES: 26

CLASSIFICATION: Unclassified

Any conflict the United States becomes involved in will be fought jointly by its armed forces. Our ability to adequately command and control forces in battle depends upon interoperable communications between the services. This study traces our efforts to develop joint tactical command, control and communications (C3) interoperability throughout the Department of Defense. By looking at the evolution of a joint management structure it shows why it has taken over 25 years to reach consensus among the services on interoperability. More importantly, it shows how we will command and control our forces if we have to fight today. This study was written for staff officers, not communicators. It provides insight into joint command and control tools available in every service. The thesis of the study is that great progress has been achieved by the war-fighting CINCs in C3 interoperability. The challenge now is for staff officers to become proficient in the use of joint command and control tools.

DTIC COPY INSPECTED 6

Accession For	
NTIS GRA&I	☑
DTIC TAB	☐
Unannounced	☐
Justification	
By	
Distribution/	
Availability Codes	
Dist	Avail and/or Special
A-1	

INTRODUCTION

War-fighting commanders-in-chief (CINCs) have made significant progress toward achieving joint tactical command, control, and communications (C3) interoperability. Although changes occurred slower than expected, CINCs improved interoperability through promulgation of joint C3 concepts and implementation of technical and procedural standards for command and control. They understand and have documented joint interoperability better than ever before.

The services are correcting deficiencies in old C3 systems and buying new ones that comply with more stringent interoperability standards. The days of an army war or a navy war are gone. Hereafter, we will fight jointly, using doctrine and concepts recognized by all the services. Foremost among their requirements will be the need for joint interoperability of tactical command, control, and communications systems.

JOINT CHIEFS OF STAFF BASIC POLICY

It is the policy of the Joint Chiefs of Staff that the military forces of the United States must possess the compatibility and interoperability necessary to ensure success in joint and combined operations. Compatibility and interoperability of tactical C3I systems are critical elements in achieving that goal.[1]

JOINT C3 INTEROPERABILITY

Within the Department of Defense and NATO, the word joint is defined as:

> Connotes activities, operations, organizations, etc., in which elements of more than one service of the same nation participate. (When all services are not involved, the participating services shall be identified, e.g., Joint Army-Navy.)[1]

Although the words, joint interoperability, are not yet defined as a phrase, the word, interoperability, is defined separately within DOD and NATO as:

> The condition achieved among communications-electronics equipment when information or services can be exchanged directly and satisfactorily between them and/or their users. The degree of interoperability should be defined when referring to specific cases.[1]

OBJECTIVE

This paper provides some thoughts about how the problem of joint interoperability evolved and why it became so important. In peacetime, jointness often loses its significance, only to emerge during occasional joint exercises where it is addressed by a flurry of intense training programs. To our surprise, we often find that after receiving the proper training, joint procedures and C3 interoperability work very well. An appreciation of recent initiatives will help the reader recognize some of the problems and potential solutions.

BACKGROUND

The word, joint, had little meaning before, during or immediately after World War II. One service would often support another, using its own doctrine and concepts while operating under its own command and control. Even though there was extensive coordination between the services, there were few multi-service operations. Failure to exchange information effectively between differing services rarely had serious results. Each service proceeded along the course of action that served it best. So there was normally little or no reliance on another service.

JOINT OPERATIONS

Joint operations were more frequent during Korea, the Dominican Republic Landing, Vietnam, and Grenada. During these conflicts, services relied more on other services for critical support. Joint concepts and doctrine emerged as we sought to find ways to increase combat power. Inter-service information exchange became critical as joint operations became more common. The lack of joint C3 interoperability led to serious results.[1] Many studies identified the problems, but few practical solutions emerged.

.CENTRALIZED MANAGEMENT STRUCTURE

The de- ralized management structure within the Department of Defense g.. : each service autonomy over its own programs. Parochial service interests eclipsed efforts to focus on the benefits of joint C3 interoperability.

Services did not define joint requirements well. Joint user equipment needs and capabilities were not clear. As a result, many multi-service efforts were abandoned due to unreconcilable differences between services. Failure to define joint requirements early in the acquisition cycle caused the loss of millions of dollars on systems which were not interoperable.

The absence of an effective central enforcement authority within the Department of Defense was probably the greatest obstacle to achieving interoperability. As each service protected its own projects, joint interoperability became more and more elusive. The Pentagon bureaucracy could not agree on an adequate enforcement directive for joint C3 interoperability.

EVOLUTION OF A JOINT MANAGEMENT STRUCTURE

The lack of a single Department of Defense manager for C3 interoperability slowed progress significantly. Segments of the C3 structure began drawing the attention of the Joint Chiefs of Staff (JCS) during the middle 1960s. It became clear that serious problems were developing in the efficient exchange of critical

information in several major weapons systems. Automated systems began appearing in larger numbers. Information moved faster and in greater volume than ever before and the old fashioned manual methods could not keep up with the new requirements.

POLICY AND PROCEDURES

In its first try to set up policy and procedures for joint interoperability, the Department of Defense issued a directive in 1967.[1] It directed the services to buy compatible or common equipment to fulfill similar operating requirements. It warned them not to rely on unique buffering or translating devices to achieve interoperability. Services had to coordinate requirements with JCS, other services, and the unified and specified commands. The responsibility for developing joint interoperability standards and an overall joint C3 architecture belonged to JCS.

TACS/TADS

As technology improved, the Navy developed an automated tactical data system to support air control and air defense systems. In 1969, JCS set up the Tactical Air Control System/Tactical Air Defense System (TACS/TADS) Program.[4] Its purpose was to show the utility of combining new joint automated systems with old C3 systems to gain better performance. The Chief of Naval Operations (CNO) was the executive agent for the program.

TACS consisted of six systems operating together to provide joint tactical air control and joint tactical air defense in the battle area. Three different tactical data information links (TADIL) evolved and became known as TADIL A, TADIL B, and TADIL J.

Efforts in those early years focused on TADIL bit-oriented messages exchanged between air control and air defense computers. It became clear that joint interoperability permitted better information exchange leading to increased combat power.

GROUND AND AMPHIBIOUS MILITARY OPERATIONS (GAMO)

JCS set up a new program in 1971 called Joint Interoperability of Tactical Command and Control Systems in Support of Ground and Amphibious Military Operations (GAMO). The Chief of Staff of the Army (CSA) was the executive agent. GAMO was much broader in scope than TACS/TADS. It included battlefield functional areas, such as operations, intelligence, fire control and combat support, in addition to air control and air defense. GAMO also included written and spoken character-oriented messages as well as the bit-oriented messages used in TACS/TADS.

There were several character-oriented messages already in use by the Navy, called Rainbow Messages, later known as Rainform Reports. There were also two data element dictionaries used as a starting point for the GAMO effort to develop message text formats (MTF). These were the DOD 5000.12, Data Element Dictionary and the Institute for Defense Analysis (IDA) Intelligence Data Elements

Authorized Standards (IDEAS). Work also began on voice message standards intended for use in spoken messages over radio.

JOINT TACTICAL INFORMATION DISTRIBUTION SYSTEM (JTIDS)

The Secretary of Defense saw the value in TADIL development. He directed GAMO to develop a permanent set of TADIL J message standards. The Joint Tactical Information Distribution System (JTIDS), under development by the Air Force since 1974, needed the new standards. TADIL J would be much broader in scope than the original three TADIL networks.

Failure to develop a C3 systems architecture necessary to ensure joint interoperability prompted the program manager to report to the Joint Chiefs of Staff in 1976 that:[1]

> After five years of GAMO program development, it is apparent that the Joint Chiefs of Staff arena is not conducive to achieving success in tactical command and control interoperability. GAMO is a program which requires executive management, probably at the Office of the Secretary of Defense level. As long as every aspect of the program is subject to Service/Agency veto or endless coordination and review, the achievement of interoperability among tactical command and control facilities and systems will be extremely difficult.

JINTACCS

Members of Congress became dissatisfied with the GAMO Program in 1977 because it was not making enough progress. It lacked high-level guidance and a strong management structure. In response to

cong .onal dissatisfaction. JCS ended the GAMC Program and creat a new program called Joint Interoperability of Tactical Comma and Control Systems (JINTACCS.)[9] The Secretary of Defense provided senior level management and the Secretary of the Army became the executive agent for JCS. The program director was a major general.

JOINT TACTICAL AIR OPERATIONS (JTAO)

The JINTACCS Program continued MTF development. In 1982 it assumed responsibility for configuration management and testing of the TADIL A, B and C standards used in Joint Tactical Air Operations (JTAO). JTAO was formerly TACS/TADS. Additionally, the JINTACCS Program became responsible for development of the TADIL J message standards for the Joint Tactical Information Distribution System (JTIDS).

JOINT TACTICAL COMMAND, CONTROL AND COMMUNICATIONS AGENCY (JTC3A)

The Joint Tactical Command, Control and Communications Agency (JTC3A) was formed in July 1984.[10] Its mission is to ensure tactical C3 interoperability for joint or combined operations (including nonstrategic nuclear forces) through the development and maintenance of a joint architecture, interface standards, and interface definitions for tactical/mobile C3 systems.[11] The

director, a brigadier general, originally reported through the Under Secretary of Defense for Research and Engineering (USDR&E) to the Secretary of Defense. Currently, JTC3A is assigned to and reports through the Director, Defense Communications Agency.[4]

The JINTACCS Program achieved notable progress in many areas by 1985. Unfortunately, efforts to revise and agree to a new joint interoperability directive were unsuccessful. Services were still able to evade joint procedures for their old ways of buying and operating C3 systems. Additionally, little progress was made in development of a joint C3 architecture. Eighteen years had passed without the services agreeing on the definition of joint tactical command, control and communications interoperability. Congress intervened again after the Assistant Secretary of Defense for Command, Control, Communications and Intelligence told the Senate Armed Services Committee that the services could not reach agreement on joint C3 interoperability. The Committee's Chairperson warned the Secretary of Defense that:[13]

> If necessary, the Senate Armed Services Committee is willing to consider a legislative restriction on the expenditure of any funds for communications equipment until meaningful progress is made toward resolving these bureaucratic problems.

Inspired by congressional warning, DOD completed their revised interoperability directive in October 1985.[14]

ARCHITECTURES

Perhaps our 25 year odyssey could have been shortened considerably had we realized sooner the importance of developing a C3 interoperability architecture. The lack of a road map caused a great deal of confusion and delay. Every agency charged with responsibility for joint tactical C3 interoperability since the mid-1960s attempted to create an architecture, but was unable to achieve service consensus. It took Congressional intimidation in the late-1980s to finally get the services to agree on a joint tactical C3 architecture.

JOINT TACTICAL C3 ARCHITECTURE

The Joint Tactical Command, Control and Communications (C3) Architecture is the aggregate of elements that define and guide the planning, programming, development, testing, evaluation, implementation and configuration management of the program.[11] It describes the concept for joint tactical and non-strategic nuclear C3 systems based upon JCS validated threat projections and force requirements. It identifies the characteristics necessary to meet operational, connectivity and communications security requirements. The architecture documents the technical and procedural interface standards required to achieve systems compatibility and interoperability. Additionally, it documents the procurement and fielding schedules needed to meet implementation objectives.

TECHNICAL AND PROCEDURAL INTERFACE STANDARDS

The introduction of technical and procedural interface standards have significantly improved joint interoperability. Technical interface standards consist of specifications of the functional, electrical and physical characteristics necessary to allow the exchange of information across an interface between different tactical C3 systems or equipment. Such things as the types of connectors on cables and the waveform transmitted by a particular radio would be described in the technical interface standards. Procedural interface standards consist of specifications for the manner of accomplishing the exchange of information across an interface.[16] Things like the format or syntax of a message, the vocabulary, the method of writing a date or coordinate and rules defining the contents of each field of a message would be contained in the procedural interface standard.

JTC3A began development of C3 architectures to improve interoperability through better planning. Information needs are translated into requirements which are met by standardized C2 systems. Players, connectivities and types of information exchanged are all addressed by the architecture. This approach lends itself well to rigorous testing of new equipment prior to production and fielding. Generic functional interoperability architectures (FIA) and CINC interoperability architectures unique to each of the war-fighting CINCs are being developed.

FUNCTIONAL INTEROPERABILITY ARCHITECTURES (FIA)

Functional interoperability architectures (FIA) cut across service and agency lines to define joint tactical C2 connectivity requirements. FIAs are developed for a generic joint task force and reflect existing doctrine, concepts and procedures. Each architecture addresses one of nine major combat functions: air defense/airspace control, special operations, fire support, combat service support, land combat operations, maritime operations, air operations, intelligence and joint task force (JTF) operations control. Six FIAs have been drafted, and the air defense/airspace control architecture has been validated by JCS and approved by the Office of the Secretary of Defense.[17] Who does what, who talks to whom, what they talk about and why are depicted in a series of diagrams and matrices which form the core of the architecture. FIAs will enable a joint or service staff to identify needs for new or revised interface standards. The architecture can serve as a source document guiding planning, programming and budgeting activities, and it can serve as a road map for acquiring and fielding new C3 systems.[18]

A byproduct of the FIA development is the Joint Connectivity Handbook containing joint communications planning factors.[19] It identifies each service's C2 elements and systems, connectivity requirements and communications means. Generic architectures provide joint staff officers the basic command, control and communications information needed to develop a plan or order.

CINC INTEROPERABILITY ARCHITECTURES

The CINC interoperability architectures are tailored to the needs of the individual unified or specified command. They are based on the CINC's specified wartime scenario and document the interoperability requirements of the tactical forces designated to support the mission and level of conflict depicted by the CINC. Contingency plans, FIAs, doctrine, procedures, tactics and other theater-peculiar variables form the architectural baseline. CINC interoperability architectures have been completed for U.S. Southern Command, U.S. Pacific Command JTF Aleutians, U.S. Forces Command and U.S. European Command."

MESSAGE TEXT FORMAT (MTF)

Increased demands for rapid, unambiguous joint tactical communications drastically changed written message formats. Highly standardized, computer-readable message text formats evolved. A growing family of special purpose JINTACCS messages are proving to be more efficient in meeting our command and control needs.

GENERAL SERVICE (GENSER) MESSAGES

Services were using many different communications systems. Most were not interoperable, even within the same service. The old-fashioned General Service Message (GENSER) format was most

common. was easily misunderstood because there was no prescribed format, or syntax for messages. The example in Figure 1 is a Severe Weather Warning message.[11] It could have been written many ways. The date and locations could have be shown in a variety of different styles. Critical information could have been shown anywhere in the message. This message could not be understood by a computer because of the infinite number of possible meanings conveyed by the changing format.

UNCLAS

EXERCISE OLIVE DRAB 90

SUBJECT SEVERE WEATHER WARNING

1. HQ 4TH ARMDIV ISSUES THE FOLLOWING SEVERE WEATHER WARNING.

A. HEAVY THUNDERSTORMS ARE EXPECTED DURING THE PERIOD 171200Z TO 171500ZJUL90. PRESENT LOCATION OF STORM CENTER IS 9523 1N12216.2W

B. MINIMUM FORECAST CEILING DURING THIS PERIOD IS 100 FT AGL. MAXIMUM FORECAST WIND SPEED IS 20KTS. WITH PEAK GUSTS TO 50 KTS. FROM 340 DEGREES TRUE. MINIMUM EXPECTED VISIBILITY IS 500 METERS.

C. THUNDERSTORM MOVEMENT IS FROM NORTHWEST TO SOUTHEAST

2. THIS IS HQ 4TH ARMDIV SEVERE WEATHER WARNING 080 17JUL90

EXERCISE OLIVE DRAB 90

BT

Figure 1 OLD GENERAL SERVICE (GENSER) FORMAT MESSAGE

JINTACCS MESSAGE TEXT FORMAT (MTF)

The introduction of JINTACCS message text formats (MTF) enhanced joint interoperability. They are machine readable message formats which retain enough structure that they can still be read by humans. The controlled structure reduces the risk of misunderstanding and takes less time to write. Computers and humans can read and understand character-oriented messages.

Figure 2 is the same Severe Weather Warning message shown in Figure 1, but written in the JINTACCS format.[11] The explicit syntax, or format of the JINTACCS message makes it much different

```
UNCLAS
EXER/OLIVE DRAB 90//
MSGID/SVRWX WARN//4ARMDIV/0021/JUL//
SEVERWX/HVYSTM//
WEATHERLOC/4523.1N12248.2W//
PERIOD/171200Z/TO:171500Z//
WEATHER/HVYSTM/VIS:500M/MINCEL:100/MAXSPD:20/GUST:50/WINDDIR:340//
RMKS/STM MOVEMENT IS FROM NORTHWEST TO SOUTHEAST//
BT
```

Figure 2 NEW JINTACCS (MTF) MESSAGE FORMAT

from the older GENSER message. Stringent protocols result in a message that has only one meaning. The MTF provides an information exchange medium that humans can still read and computers can process.

INTEGRATED DISPLAY SYSTEMS

Structured message formats can be integrated with automated display systems which sort, parse and display data without human intervention. Figure 3 shows an example of how the JINTACCS Severe Weather Warning message from Figure 2 might be displayed.[11] The arrows above the airplane symbols, next to the four airfields, indicate the airfield operational status. The arrow points up if the airfield is open and down if it is closed. The thunderstorm symbol reflects its location at the time shown and the arrows between the thunderstorm symbols show its movement. The airfield southeast of the thunderstorm will be closed from

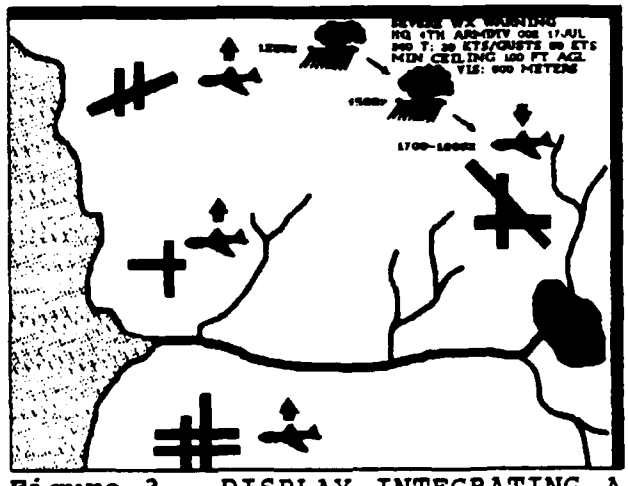

Figure 3 DISPLAY INTEGRATING A JINTACCS MTF

1700-1800Z w. ıe thunderstorm moves over it. Such integration reduces the ɜk of misunderstanding because the computer interprets the essage without human intervention. Other relevant data such as runway damage could be parsed, or extracted from other JINTACCS messages such as a Situation Report (SITREP) and displayed similarly.

JINTACCS AUTOMATED MESSAGE PREPARATION SYSTEM (JAMPS)

The JINTACCS Automated Message Preparation System (JAMPS) is one of several automated tools being used to decrease message preparation time. It provides a skeletal frame for the message and writes all the standard text for the writer, allowing for the insertion of critical, unique data. JAMPS checks data entered by the writer to ensure it conforms with all the JINTACCS rules.

Tactical Data Information Link (TADIL)

The growth of automation throughout the armed forces requires more efficient man-to-machine interfaces to handle larger and more rapid information transfer. The JTIDS family of tactical data information links (TADIL A, B, C and J) provide a greatly increased capability to process data quickly and efficiently. Within NATO, there is a similar effort to develop corresponding networks (NATO LINK 11, 11B, 4 and 16).

Battlefield control functions associated with fire control

and radar target tracking involve frequent transmission of large volumes of data. Tactical data information links between radar platforms, combat information centers and attack aircraft carry digital bit-oriented messages which are not readable by humans. For example, computers in a target acquisition radar might send track numbers, bearing, and range data as often as every five seconds to a fighter aircraft.

Humans cannot write and send data at a rate fast enough to provide accurate targeting data. So computers generate machine language messages by using accepted protocols and procedures. Advancements in the development of TADIL A, B, C and J have significantly enhanced joint interoperability and improved the rate of data exchange in the air defense/airspace control, fire control and air operations functional areas.

JTIDS TADIL J

TADIL J is going to include all the capabilities which are now part of TADIL A, B, and C. Several hundred combatants and support platforms will participate simultaneously in its 127 different nets. TADIL J will have multiple, similar nodes, each connected to two or three other nodes. Every node will be capable of relaying data around a disabled node, so in effect the network is self-healing. No single node will be critical to the operation of the entire network, so its survivability will be greatly

enhance Many automated weapons systems will be connected together by UHF radio links operating in the TADIL J frequency band. Figure 4 shows how JTIDS TADIL J air operation nets might be interconnected.[4] Weapons systems from different services will be fully integrated with target acquisition and target tracking platforms. Target tracking data will be sent to computers on fighter aircraft over secure, anti-jam, UHF radio links. TADIL J will permit data exchange at a rate over 200 times faster than TADIL A or B. Extremely accurate position and identification data is also available over this type of JTIDS network.

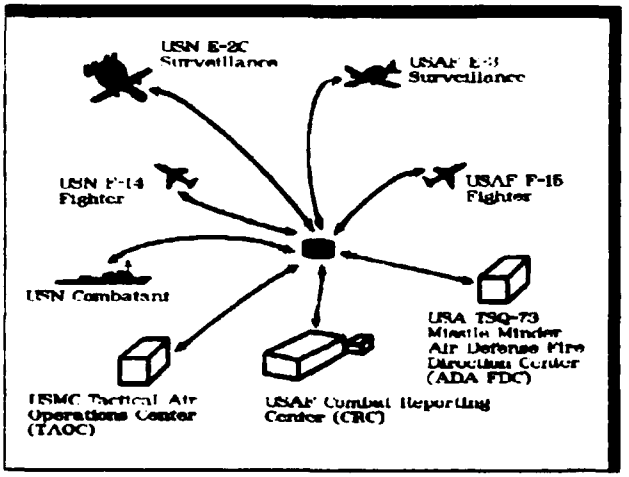

Figure 4 JTIDS TADIL J NETWORK

JOINT TADIL PERFORMANCE CHARACTERISTICS

TADIL networks provide a near real-time exchange of information which is normally not directly readable by humans. Data is processed and then integrated into symbolic or alphanumeric displays for human use. This method of data exchange is much more efficient than spoken or written communications. Normal air operations might require hundreds of target tracks to be exchanged between radar platforms and fighter aircraft. Track data would have to be updated every ten seconds. Tracking 250 targets could

require 75,000 to 100,000 messages per hour. It is easy to see that computer-to-computer data transfer is essential. Figure 5 shows a comparison of TADIL performance characteristics.[11] The five U.S. TADIL systems are listed across the top. Six performance characteristics are shown down the left side. TADIL A, B, C and J have been discussed; however, IJMS has not. It is the Interim Joint Message Standard developed by the USAF for the NATO E-3 Program. It provides primarily surveillance data from the E-3 aircraft to the Combat Reporting Center.

JOINT TADIL PERFORMANCE CHARACTERISTICS

TADIL	A	B	C	IJMS*	J
Participants	20	2	8	Many	Hundreds
Nets	1	1	1	1	127
Critical Nodes	Yes	Yes	Yes	Yes	No
Jamming Protection	No	No	No	Yes	Yes
Secure	Yes	Yes	No	Yes	Yes
Data Rate (KBPS)	1364 or 2250	6000 or 1200	5.000	28.80 to 238.0	28.80 to 238.0
Message Type Series	M	M	V & R	I	J

* IJMS is the Interim Joint Message Standard

Figure 5 JOINT TADIL PERFORMANCE CHARACTERISTICS

SUMMARY

We have overcome several of the major interoperability problems such as the lack of policy and architecture. The 1986 JCS mandate to the services to implement JINTACCS messages in all joint readiness exercises was the turning point. Through numerous exercises, staff officers trained intensely to learn and relearn how to use MTFs, only to forget again shortly after returning to their normal service operations. However, there are signs that

ser[illegible].re now using JINTACCS messages much more in day-to-day oper[illegible].s. The benefit of learning one system well and using it in se[illegible].ce-unique as well as joint operations is obvious.

For example, many Army divisions now have laptop computers in each division staff section. The primary reason for acquiring those computers was to give staff officers a portable command and control tool capable of using the JINTACCS Automated Message Preparation System (JAMPS). JAMPS is the key to a rapid transition from GENSER to JINTACCS. Once proficiency in reading and writing MTF messages is achieved, staff officers tend to stay with the MTF for day-to-day use. It is easier to write a JINTACCS MTF message using JAMPS because it only requires the writer to provide the critical data. Since JAMPS is interactive, assistance is provided whenever necessary. Another major benefit accrued from the use of the laptops is a reduction of message handling time. When JAMPS finishes its error-checking routine, it produces an ASCII data file which can be transmitted over the built-in telephone modem directly to the telecommunications center.

Progress in the use of TADIL networks has been even greater. It is less obvious because we humans do not directly read the bit-oriented TADIL messages. Consider the increase in the number of modern, computer assisted weapons systems being fielded today. Most of them will be part of the evolving TADIL environment.

There is much more to be done to correct all the deficiencies in our existing joint C3 systems. If we are going to optimize our capability to generate combat power on the battlefield, all new C3

systems must meet the established joint tactical C3 interoperability standards.

CONTINUE CONGRESSIONAL OVERSIGHT

Congressional persistence since the mid-1960s brought progress in achieving joint tactical C3 interoperability. Congress had to threaten to withhold funds to force the services to meet interoperability criteria. Members of Congress must continue to put pressure on the Department of Defense. By giving more authority to the Chairman of the Joint Chiefs of Staff, Congress significantly strengthened his ability to mitigate service parochialism.[16] I recommend continued intense Congressional oversight and that the Chairman of the Joint Chiefs of Staff vigorously enforce established policies for interoperability.

INCREASE CINC INFLUENCE

JCS set up the Tactical C3I Interoperability Improvement Program to identify, coordinate, prioritize and resolve critical interoperability requirements and issues.[17] CINCs, services and agency representatives voice their needs and requirements in this annual forum. The chairperson is the Director for C3S, OJCS. The Director, JTC3A convenes a preliminary Screening Board which develops recommendations on priorities, funding and fielding issues. He then chairs the General/Flag Officer Prioritization

Board review those recommendations and forward them to the Director for C3S. JCS processes them under JCS MOP 132. That sets up priorities for the funding and fielding necessary to achieve joint interoperability.

I recommend war-fighting CINCs be given more influence over the funding and priority decisions for procurement and fielding of C3 systems. Their views on joint C3 requirements should have precedence over service views since unified commands, not the services, fight wars. The process of changing and developing new MTF and TADIL standards is very slow and complicated because CINCs, services and specified DOD agencies all must reach consensus on every change. I recommend the services and DOD agencies defer to the war-fighting CINCs in all cases involving joint war-fighting procedures. JINTACCS must be more responsive to the war-fighting CINCs.

LIFE-CYCLE APPROACH TO INTEROPERABILITY

Our focus has shifted from a piecemeal approach to a full life-cycle strategy for achieving and maintaining joint tactical C3 interoperability. Emerging joint concepts and doctrine provide the foundation. Architectures provide a framework of technical and procedural standards which are verified through rigorous joint testing at the JTC3A Joint Test Facility and in the field. The Joint Exercise Program checks and validates the effectiveness of joint training.

When changes are necessary, the configuration management system provides controlled and coordinated changes that keep pace with new requirements. This centralized management structure deals more efficiently with the joint tactical C3 interoperability problem than the decentralized DOD management structure of the early 1960s.

I recommend keeping the Assistant Secretary of Defense for Command, Control, Communications and Intelligence responsible for ensuring that all DOD Components comply with our joint tactical C3 interoperability policy. Having a principal assistant to the Secretary of Defense as the chief advocate for joint interoperability strengthens the program. Additionally, purchase of a major, new C3 system requires both the Under Secretaries of Defense for Policy and for Research and Engineering, and the Assistant Secretary of Defense for Acquisition and Logistics to review the requirement for compliance with interoperability policy prior to purchase.

ENFORCE ESTABLISHED POLICY AND PROCEDURES

We now have a coherent policy for compatibility and interoperability of tactical C3I systems in DOD Directive 4630.5. JCS MOP 160 implements DOD Directive 4630.5. It provides JCS policy and designates the responsibilities and procedures needed to carry out that policy. If those who can authorize exceptions to interoperability policy, use that power cautiously, existing C3

interoperability problems can be corrected and new ones avoided.

There are 147 approved JINTACCS MTF messages. Their use is mandatory in all joint exercises. Intense training in message preparation is still required before every exercise since many participants are not trained to use MTFs. The investment in time and equipment resources needed to become proficient is significant. However, it is clear that the benefits exceed the costs.

I recommend the services require the use of JINTACCS MTF messages during all training and normal operations. We should train the same way we are going to fight, and that will be jointly. Continued use of old general service (GENSER) messages should be discouraged since the new JINTACCS MTF messages offer so many advantages.

The use of MTFs and TADIL systems on the battlefield has significantly enhanced our combat power. Operation Just Cause, in Panama, demonstrated again that war-fighting CINCs have made significant progress toward achieving joint tactical command, control and communications interoperability. The challenge facing the services now is for all staff officers to become proficient in the use of the joint command and control tools available on the modern battlefield.

ENDNOTES

1. Joint Chiefs of Staff, Memorandum of Policy 160. Compatibility and Interoperability of Tactical Command, Control, Communications, and Intelligence Systems. Washington D.C.: GPO, Issued May 3, 1967, 3rd Revision Issued January 7, 1986, p. 2 (hereafter referred to as "MOP 160").

2. Joint Chiefs of Staff, Publication 1. Dictionary of Military and Associated Terms. Washington D.C.: GPO, June 1, 1987, p. 199 (hereafter referred to as "JCS Pub 1").

3. Ibid., p. 194.

4. Frank C. Conahan, Report of the Assistant Comptroller General to the Chairman, Legislation and National Security Subcommittee, Committee on Government Operations, House of Representatives, INTEROPERABILITY - DOD'S Efforts to Achieve Interoperability Among C3 Systems. Washington D.C.: U.S. General Accounting Office, National Security and International Affairs Division, April 1987, pp. 8-19.

5. U.S. Department of Defense, Directive 4630.5. Compatibility and Commonality of Equipment for Tactical Command and Control, and Communications. Washington D.C.: GPO, January 28, 1967.

6. Joint Chiefs of Staff, Service Memorandum 92-69. Compatibility of Tactical Air Control/Air Defense Systems in Joint Military Operations. Washington D.C.: GPO, February 13, 1969.

7. Joint Chiefs of Staff, Service Memorandum 205-71. Joint Interoperability of Tactical Command and Control Systems in Support of Ground and Amphibious Military Operations. Washington D.C.: GPO, April 1, 1971.

8. Conahan, p. 24.

9. Joint Chiefs of Staff, Service Memorandum 184-78. The Program for Achieving Joint Interoperability of Tactical Command and Control Systems. Washington D.C.: GPO, March 7, 1978.

10. U.S. Department of Defense, Directive 5154.28. Joint Tactical Command, Control, and Communications Agency (JTC3A). Washington D.C.: GPO, July 5, 1984.

11. Ibid, p. 1.

12. Department of Defense, Directive 5105.19. Defense Communications Agency (DCA). Washington D.C.: GPO, December 12, 1983.

13. Comman, p. 22.

14. U.S. Department of Defense, Directive 4630.5. Compatibility and Interoperability of Tactical Command, Control, and Communications, and Intelligence Systems. Washington D.C.: GPO, October 9, 1985.

15. DOD Directive 5154.28, Encl 2, p. 2-1.

16. Ibid., p. 2-1.

17. Jerry O. Tuttle, "CINCs' Impact on C3 Systems Planning and Acquisition." Signal, February 1989, p. 37.

18. Darvel C. Stutz, "Architectures for Tactical C2 Interoperability," Signal, November 1989, p. 86.

19. Defense Communications Agency, Joint Tactical Command, Control and Communications Agency Handbook 8000. Joint Connectivity Handbook, Fort Monmouth, NJ, December 15, 1987.

20. Stutz, pp. 87-88.

21. Amilcar Vazquez, Colonel, USMC, Deputy Director for JINTACCS Program Management, JTC3A, JINTACCS PROGRAM, March 13, 1989, p. 34.

22. Ibid., p. 35.

23. Ibid., p. 36.

24. Ibid., p. 26.

25. Ibid., p. 27.

26. U.S. Congress, Public Law 99-433. Defense Reorganization Act of 1986, Washington D.C.: GPO, 1986.

27. MOP 160, p. 33.